CLAIMS

What is claimed is:

1.   A downhole telemetry and power system for use with a
borehole extending into a formation, the borehole including a
casing positioned within the borehole and a piping structure
contained within the casing, the system comprising:

     a surface data processor operative to provide data and
commands in a digital format;

     a surface modem having an input coupled to the surface data
processor and an output coupled to the casing and piping
structure, the surface modem operative to modulate a signal having
a first frequency band with data and commands received from the
surface data processor in a first modulation scheme to provide a
transmitted command and data signal;

     a downhole modem coupled to the casing and piping structure
and configured and arranged to receive the transmitted command and
data signal, the downhole modem operative to demodulate the first
modulation scheme and to recover the downhole transmitted data and
commands;

     a retentive memory operative to store data and commands;

     a downhole processor coupled to the retentive memory and to
the downhole modem, the downhole processor operative to receive
recovered data and commands from the downhole modem and to store
the recovered data and commands in the retentive memory;

     whereby the downhole processor is reprogrammed from the
surface data processor using the transmitted data and commands.

2.   The system of claim 1 wherein the retentive memory is a
FLASH memory.

3.   The system of claim 1 wherein the transmitted data and
commands can include new receive and transmit carrier frequency
values.

-34-

4. The system of claim 1 wherein the transmitted data and commands can include a new modulation structure and the appropriate executable digital signal processing code to process same.

5. The system of claim 1 wherein the transmitted data and commands can include a symbol rate value.

6. The system of claim 1 wherein the transmitted data and commands can include a new address value.

7. The system of claim 1 wherein the transmitted data and commands can include new values of parameters associated with the relaying of messages.

8. The system of claim 1 wherein the transmitted data and commands can include changes to the one or more bit fields contained within the communications packet format.

9. The system of claim 1 wherein the transmitted data and commands can include any internal variables and coefficients which form part of the modem processing..

10. The system of claim 1 further including a surface retentive memory coupled to the surface data processor, the retentive memory configured and arranged to receive data and commands from a data source.

11. The system of claim 10 wherein the data source is data transmitted over the Internet.

12.   The system of claim 10 wherein the data source is data
transmitted over a company intranet.

13.   The system of claim 10 wherein the data and commands can
include new receive and transmit carrier frequency values.

14.   The system of claim 10 wherein the data and commands can
include a new modulation structure and the appropriate executable
digital signal processing code to process same.

15.   The system of claim 10 wherein the data and commands can
include a symbol rate value.

16.   The system of claim 10 wherein the data and commands can
include a new address value.

17.   The system of claim 10 wherein the data and commands can
include new values of parameters associated with the relaying of
messages.

18.   The system of claim 10 wherein the data and commands can
include changes to the one or more bit fields contained within the
communications packet format.

19.   The system of claim 10 wherein the transmitted data and
commands can include any internal variables and coefficients which
form part of the modem processing..

20.   The system of claim 10 wherein the data source is the
surface data processor.

-36-